

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF TELECOMMUNICATIONS POLICY

WASHINGTON, D.C. 20504
October 7, 1970

DIRECTOR

DOC Declassification & Release Instructions on File - No referral to DOC

MEMORANDUM FOR

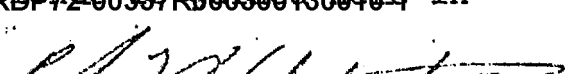
George P. Shultz
Director
Office of Management and Budget

This Office has reviewed carefully the Commerce Department budget request for supplemental funds for FY 71. This review was undertaken with particular reference to Reorganization Plan No. 1 of 1970 and Executive Order 11556.

Our review indicates that while some change of emphasis and direction may be required, at least \$2.1 M of the Commerce request represents fully justifiable specific activities that I consider minimally necessary to support our new range of telecommunications activities. This Office has worked with Commerce over the last few weeks to reduce their FY 71 supplemental plans to the smallest expenditure level consistent with the scope and intent of our new responsibilities and with assurance that the activities planned were feasible in the FY 71 time frame. We therefore support the Commerce request. Some restructuring of the Commerce program is necessary, however, to make it compatible with OTP's programs and to fully develop the support concept envisaged for Commerce in the Reorganization Plan.

The specific comments and supporting rationale with regard to our proposed revisions of the Commerce program are contained in the attached analysis, together with an edited version of the Commerce proposal reflecting our suggestions.

It should be recognized that the detailed functions of the Department of Commerce in support of this Office are in the formative stage and must, to a degree, evolve on a gradual basis. Continuing guidance in specific areas will be furnished to the Department. Approved For Release 2001/11/01 : CIA-RDP72-00337R000300130010-1 in OTP.



OTP COMMENTS ON DEPARTMENT OF COMMERCE
SUPPLEMENTAL ESTIMATE, FISCAL YEAR 1971

OTP COMMENTS ON DEPARTMENT OF COMMERCE
SUPPLEMENTAL ESTIMATE, FISCAL YEAR 1971

1. Justification of Requirements

- (a) Page OT-6 - Second para: Amend sentence beginning on fourth line to read "This new office is to formulate...."

Reason: OTP is not "to help" but is to do the formulating.

- (b) Page OT-6 - Third para: Change "assist" to "support".

Reason: Carry out intent of E. O. 11556.

- (c) Page OT-6 - Fourth para: Change first line to read: "Under the policy guidance and direction of the Director of the Office of Telecommunications Policy, the Department of Commerce will provide support as reflected in Section 13 of E. O. 11556. This includes performance of analysis,...."

Reason: To reflect clearly the relationship of OTP and Department of Commerce (Office of Telecommunications) pursuant to E. O. 11556.

- (d) Page OT-6 - Fifth para: In the first line insert the word "support" just before "responsibilities."

Reason: To place the programs in proper context.

- (e) Page OT-7 - First full para: Change "measurement of electrospace usage" to read "implementation of a spectrum monitoring capability."

Reason: To express the proposed new sub-activity in more precise terms.

- (f) Page OT-8 - First full para: Amend second sentence to read: "Responsive to OTP policy guidance, it will provide centralized technical and administrative support for the Interdepartment Radio Advisory Committee (IRAC), for coordination of frequency usage of the Executive Branch Departments and agencies; maintaining information necessary for such purposes, and analysis capabilities to assure compatibility of these assignments."

Reason: To more accurately reflect the required activity.

2.

- (g) Page OT-9 - Change activity at top of page to read "Frequency assignment support."

Reason: To follow concept of E. O. 11556.

- (h) Page OT-9 (and continuing to OT-10) - Under "Summary by project" delete "Measurement of electrospac usage" and substitute "Implementation of spectrum monitoring capability"; at bottom of page revise paragraph heading to read "Implementation of Spectrum Monitoring Capability"; starting with last paragraph on the page and all of page OT-10 - delete entire text and substitute the following:

"One of the effective tools in the management of the frequency spectrum is the capability to monitor, measure and analyze emissions throughout the electromagnetic spectrum. These measurements provide: 1) valuable assistance in resolving problems of congestion and interference and 2) one of the diagnostic tools necessary for National Telecommunications Policy formulation.

"During FY 1970, contractual research was started by the Office of Telecommunications Management that would define an initial monitoring/measurement program for the Federal Government.

"In furtherance of the program undertaken in FY 1970, a monitoring project will be implemented by the Office of Telecommunications to provide a capability for making spot checks on a nationwide basis as to how well the radio spectrum is being used by the various federal agencies. It will also be the medium whereby the office can establish for OTP the credibility and accuracy of the data being reported by the various agencies in the frequency management area. Also, for the first time there will be a capability for obtaining data on how well the established rules and regulations are being complied with. Some of the parameters to be examined are -- time on the air, location of equipment, frequency of the carrier, and spurious emissions.

3.

"Specifically, a vehicle will be procured and equipment installed suitable to gather data on the parameters identified by the FY 1970 research. After installing the equipment and verifying its proper operation, data will be collected and examined to ascertain the validity of reported usage information and to determine how well the various users are complying with established rules and regulations.

"Mutual agreement on usage definition must be reached by users, regulators and those responsible for frequency allocations. Such definition must include actual measured usage and channels kept clear for emergencies. New reporting formats will be developed for reporting of usage. Existing reports too often give intended rather than actual use.

"Information on usage will be collected both by improved user reporting techniques and by field measurements to obtain objective information on actual frequency usage. Such information will be combined with reported usage to determine the availability of the spectrum, directions required for optimal use and predicting areas of imminent conflict."

Reason: To re-orient the proposed sub-activity to be responsive to an OTP requirement and to take advantage of research efforts already accomplished. The text submitted by the Department of Commerce is considered to be vague as to specifics to be accomplished under the sub-activity. There is important needed work to be done in the field of radio frequency spectrum monitoring and measurements. Rather than a generalized program, what is needed is development of a diagnostic monitoring/measuring capability to test the validity of mathematical models that would be developed. If testing proves warranted, the program can then be expanded starting with FY 1972.

- (1) Page OT-11 - Recommend retain title but replace entire page of text with the following:

4.

Users of the radio frequency spectrum are increasing at an unprecedented rate. Several major studies of telecommunications over recent years have noted an apparent crises due to congestion in some parts of the radio frequency spectrum. Problems among the increasing numbers of telecommunications devices have arisen as regards the likelihood of their functioning satisfactorily in intended operational environments. There are many problem areas that preclude assurance that the Nation is realizing the most effective utilization of the radio spectrum. Deficiencies contributing to these problem areas are:

- a lack of sufficient frequency management data base;
- a lack of adequate standards pertaining to spectrum occupancy;
- a lack of enforcement capability;
- a proliferation of undiagnosed electromagnetic radiations that could cause harm to human, animal, and plant life;
- a lack of an analytical capability to assure that communications-electronics devices will function satisfactorily in their intended operational environment.

There has been some exploration and documentation of the problem areas through previous contractual efforts. These efforts, corroborated with the recently completed study by the Joint Technical Advisory Committee of the Institute of Electrical and Electronics Engineers, Inc., and Electronic Industries Association, have made it abundantly clear that a major frequency management capability must be developed if the over-all function in this area is to be accomplished efficiently, effectively, and economically.

"Routine engineering methods can no longer cope with the rapidly expanding requirements for communications-electronics if the limited and highly congested radio frequency spectrum resource is to be used efficiently. All the essential facts must be considered -- technical, economic, social and operational -- which bear on

5.

frequency management decisions, and the tools must be made available to perform this task in a timely manner.

"Initial work to build up a capability to cope with the foregoing cannot start soon enough. Some services are being denied because of the uncertainty of communications-electronics systems being able to operate in their intended environments. Economic losses have been sustained because of insufficient confidence on the part of private industry to design communications-electronics systems to meet foreseen needs. Millions of dollars have been and are being spent on "fixes" -- modifications to electronics equipment -- after installation because of unpredicted interference situations.

"Two particularly critical areas where a capability such as the foregoing is needed are 1) Space Telecommunications and 2) Problems of Urban Areas. The former is entirely dependent on radio for its utility. Launch vehicles are guided by radio and the satellite's position determination as well as information obtained and relayed are all accomplished through various forms of radio. There have been instances of aborted missions and lost information because of insufficient capability to evaluate and analyze the type of environment into which spacecraft will be projected. This situation will become more serious unless remedial measures are taken.

"Problems of urban areas are significant for several reasons. Law enforcement officials are putting increasing dependence on communications systems to enhance their enforcement capability. Communications are being called upon increasingly in many other areas of urban living including business radio, pollution control, and safety and rescue operations.

"These are but two of the more severe problem areas in which the type of capability as proposed herein would provide and perform a vital service.

6.

Inherent in the foregoing, and essential to conducting radio frequency assignment actions, is the continued development of automated data processing techniques for spectrum management. Time sharing computer operations, use of video displays, and an increasingly sophisticated data base are among the tools that must be developed.

Reason: To re-shape the Department of Commerce proposed sub-activity to meet more directly a critical requirement in radio frequency management. Although in the right direction, the text as submitted does not stress or spell out sufficiently the deficiencies, needs, and reasons that action must be started now. This sub-activity is an important one. It should be cast in a manner as to warrant budgetary support.

The examples cited in the Department of Commerce draft text, while relevant, are insignificant compared to the critical need for a program as described above. Space telecommunications "across the board" and the developing complexities of problems in the urban areas are of considerably greater magnitude.

- (j) Page OT-12 - Change activity to read: "Analysis Support for Policy Formulation"; delete under summary by project "cost, demand and price data" and replace with "Telecommunications Information Base."

Reason: To reflect more accurately the support nature of the activity and better describe the function to be performed.

- (k) Page OT-13 - Delete first two paragraphs and replace with the following text:

"The communications problems of the State of Alaska present a special and unique situation. Heretofore the State had been dependent on the military owned Alaska Communication System (ACS) for its telephone and telegraph and associated communications. The sale of the ACS to the Radio Corporation of America (RCA) presented a large number of communications problems with which the State was unable to cope. In order to carry out the transfer of the ACS to RCA

7.

in a timely fashion, and at the same time enable the State of Alaska to carry out its responsibilities, the Department of Commerce was directed to render assistance. \$200,000 of the current request are budgeted to complete this "on-going" assistance effort.

"The Department of Commerce will take advantage of experience gained to develop a model that may be of possible beneficial to other States faced with communications problems. The explosion of local and urban communications is requiring State authorities to develop management and regulatory capabilities to handle problems associated therewith."

Reason: By earlier agreement the Alaska Communication System was sold to RCA for \$30M plus a commitment of another \$30M to upgrade the service. Unquestionably the State of Alaska needs consultative type advice to cope with communications problems of this scale and it is in the U.S. Government interest to provide such service. The Department of Commerce has already provided some assistance with regard to Alaska communication services and there is a requirement to continue such assistance by completing current efforts.

Page OT-13 (cont'd) - Add new paragraph of supporting text immediately after the third paragraph as follows:

"Federal assistance funds in the telecommunications areas are not visible to State and local government applicants; are administered with a variety of formulas pertaining to matching funds requirements; are not flexible to permit State and local governments to develop multi-function supporting systems; are not uniform as they concern procurement regulations; are administered most often directly to State and local agencies without Governor or Mayor coordination; may or may not be for demonstration purposes, although they generally are; do not take into account State funding requirements after project termination; are duplicative in many cases; and generally are not coordinated among Federal agencies having similar programs and funds. Policy in these subject areas is needed."

8.

Reason: There is definitely a need for a forum for State and local government authorities to develop information at the Washington level. This plus the coordination function are necessary and are considered to be proper functions to be carried out by the Office of Telecommunications under the policy guidance and in support of OTP. The expanded text is intended to strengthen the support for this budget item.

Page OT-13 (cont'd) and continuing through first three paragraphs page OT-14: Delete all present text and under "Impact of Tariff Changes" substitute the following:

Over the years telecommunications in all its facets has developed into an essential element of the private, commercial, and public life in the United States. No longer are telephone and telegraph systems luxurious adjuncts to mail and messenger services. They are essential to the conduct of the affairs of the nation -- akin to the nervous system in humans. There is an increasing need to weigh the reliance of the economy on telecommunications, to assess the impact of tariffs on all, and finally the converse, to assess the impact of imposed tariffs on the operating and producing interests in the field of telecommunications. Establishment of broad national policy for the use of telecommunications will depend to a significant degree on the substantive information gained through a program of this type.

Reason: The OTP believes that the Department of Commerce has a long term role in analysis of the effects of tariffs on the telecommunications industry. The proposed program will not duplicate on-going study efforts concerned with Federal Government leased line charges being accomplished under Department of Defense (National Communication System) auspices. Nor will this activity duplicate or displace the activities of the General Services Administration with regard to its role in representing the Federal Government as a user of telecommunications. The OTP will need information derived from the planned Department of Commerce activity to maintain a broad overview of the DOD, GSA, and private interest activities and interrelationships.

9.

Page OT-15 - Delete title "Cost, Demand and Price Data;" and substitute "Telecommunications Information Base".

Reason: To more accurately reflect the nature of the sub-activity.

- RECOMMENDED REPLACEMENT TEXT -

DEPARTMENT OF COMMERCE
OFFICE OF TELECOMMUNICATIONS

Justification of Requirements

This fiscal year 1971 supplemental budget request for the Office of Telecommunications is for \$2,415,000. This amount, together with the \$1,899,000 now available through transfers of funds from within and outside the Department of Commerce will provide a total of \$4,314,000 for research, engineering, analysis, and operations by the Office of Telecommunications during fiscal year 1971.

Reason for Supplemental Request -- On April 20, 1970, the President's Reorganization Plan No. 1 of 1970 took effect. This plan and Executive Order No. 11556 created the new Office of Telecommunications Policy (OTP) in the Executive Office of the President. The new office is to help formulate government policies concerning the wide range of domestic and international telecommunications issues facing the nation, and help develop plans and programs which take full advantage of the nation's technological capabilities in the telecommunications field, including their application to the Federal government's own vast communications systems. These programs will enable the Executive Branch to be a more effective partner with the Congress and the Federal Communications Commission in their deliberations on telecommunications matters, without taking away any of the prerogatives or functions assigned to the Federal Communications Commission by the Congress.

To ^{support} ~~assist~~ the Office of Telecommunications Policy in fulfilling its responsibilities, Executive Order No. 11556 assigned to the Secretary of Commerce the activities described below.

The Secretary of Commerce has been requested to perform Under the policy guidance and direction of the Director of the Office of Telecommunications Policy, the Department of Commerce will provide support as reflected in Section 13 of E.O. 11556. This includes performance of analysis, engineering and administrative functions, including the maintenance of necessary files and data bases, responsive to the needs of the Director in the performance of his responsibilities for the management of the radio spectrum; conduct technical and economic research upon request to provide information and alternatives required by the Director; conduct research and analysis on radio propagation, radio systems characteristics, and operating techniques affecting the utilization of the radio spectrum in coordination with specialized, related research and analysis performed by other Federal agencies in their areas of responsibility; conduct research and analysis in the general field of telecommunication sciences

In support of other Government agencies as required and in response to specific requests from the Director; and conduct such other activities as may be required by the Director to support him in the performance of his functions.

Four major program activities are required to meet these support responsibilities, (1) a frequency assignment activity for frequency coordination and compatibility analysis (2) an analysis for policy formulation activity to provide information and assessments to Federal, state and local government agencies, (3) a technology and systems activity to provide telecommunication and research services in support of government agencies and (4) an electromagnetic wave propagation activity to provide the technical basis for reliable and economical communication through the electrospace. Executive direction and administration constitute a fifth program activity.

A supplemental appropriation for FY 1971 is required to meet the most urgent needs in the following new subactivities: measurement-of-electro-space-usage, Implementation of a spectrum monitoring capability, frequency assignment and compatibility, assistance to Alaska and other State and local governments, impact of impending tariff changes on Federal leased-line telecommunications systems, improvement of U. S. telecommunications exports, and cost, demand, and price data. In addition to funds for these new subactivities, a supplement to the presently available funds for executive direction and administration is required. No supplemental funding is requested for other ongoing subactivities.

This request is in response to many studies made over the last twenty years and in particular to seven major recent recommendations. In March 1965 the Military Operations Subcommittee of the Committee on Government Operations submitted to the Congress a reorganization plan to reconstitute the functions and responsibilities of the Director of Telecommunications Management in a separate office in the Executive Office of the President, and take steps to insure that the office is adequately staffed. In October 1966 the Department of Commerce Technical Advisory Board, Telecommunication Science Panel recommended in their report, "The Silent Crisis", a Federal research organization for technical, economic, and social analysis and information to improve spectrum utilization. This organization was seen as serving the Office of Telecommunications Management, the Federal Communications Commission, the Department of State and all interested government, industrial and academic institutions. Also in October 1966 the Office of Telecommunications Management in the Office of Emergency Preparedness reported essentially the same findings in their report, "Frequency Management within the Executive Branch." The Joint Technical Advisory Committee (JTAC) of the Institute of Electrical and Electronics Engineers and the Electronic Industries Association published a report, "Spectrum Engineering--The Key to Progress" in March 1968. In

this they recommended that the government establish a spectrum engineering capability to serve the Federal Communications Commission, the Office of Telecommunications Management, and government and non-government users. This capability would include engineering, advanced analysis, data accumulation, and frequency monitoring. The President's Task Force on Communications Policy "Final Report" of December 1968 was submitted to the Congress and the public last year. This proposed a strengthened executive branch capability with adequate technical and financial resources to make long range studies; explore new applications; coordinate policies; manage the consolidated spectrum; and advise Federal, State, and private groups. The Bureau of the Budget in "Study of Federal Communications Organization", also of December 1968, recommended a strong policy, planning, and total spectrum management organization in an executive department using parts of the Office of Telecommunications Management as a nucleus. In July 1969, the Comptroller General of the United States reported to the Congress his "Review of Status of Development Toward Establishment of a United National Communications System." He recommended establishment of an organization with stature, authority and resources sufficient to provide a strong central authority and central focal point for telecommunications matters.

The Office of Telecommunications

The Department's Office of Telecommunications has been constituted to meet the new responsibilities. ~~It will provide centralized technical and administrative support for coordination of Federal frequency usage, providing information necessary for assignment of frequencies to Federal agencies and assurance of compatibility of these assignments.~~ Responsive to OTP policy guidance, it will provide centralized technical and administrative support for the Interdepartment Radio Advisory Committee (IRAC), for coordination of frequency usage of the Executive Branch Departments and agencies; maintaining information necessary for such purposes, and analysis capabilities to assure compatibility of these assignments. The Office will serve the newly created Office of Telecommunications Policy as a source of technical research and analysis and for such economic analysis as would be appropriate for making representations and decisions on policy issues, including studies for efficient allocation and utilization of telecommunication resources, forecasts of technological developments and future needs, and assessment of particular technical developments such as the convergence of computer and communication technologies. It will serve the Secretary of Commerce and Department of Commerce bureaus with information on telecommunications matters required to carry out these responsibilities. It will serve other Government agencies in conducting a central Federal program of research and service, in telecommunications technology and sciences. The Department of Commerce research and analysis facilities which have centrally served other agencies and industry for over two decades in

The field of radio propagation will be directed into areas of frequency management support and system analyses including electromagnetic wave propagation, efficient utilization of the electromagnetic spectrum as a national resource, and standards of practice and measurement of system performance for both radio and wire systems. These services are and will be available to other Federal agencies, industry, state and local governments, professional groups and U. S. representatives to international conferences. It will also contract for interdisciplinary university programs, where authorized, to study the principles underlying telecommunications policy and conduct such other activities in support of the Director of the Office of Telecommunications Policy as may be agreed from time to time between the Director and the Secretary of Commerce.

Supplemental FY 1971 Budget Request
to the Office of Management and Budget

Office of Telecommunications, Department of Commerce

Justification of Program Changes
(Dollar amounts in thousands)

Appropriation: Research, Engineering,
Analysis, and Operations

Activity: Frequency
assignment
support

Summary by Project or Line Item:	1971 Presently Available		1971 Revised Estimates		1971 Proposed Supplemental	
	Perm.		Perm.		Perm.	
	Pos.	Amount	Pos.	Amount	Pos.	Amount
Interdepartmental Radio Advisory Committee.....	21	\$208	21	\$208	...	...
Measurement-of-electrespace usage Implementation of Spectrum Monitoring Capability.....	...	...	14	498	+14	+\$498
Frequency assignment and compatibility.....	...	...	22	653	+22	+653
Total requirements.....	21	208	57	1,359	+36	1,151

Justification:

Interdepartmental Radio Advisory Committee (no increase)

No increase is requested at this time for the secretarial functions of the Interagency Radio Advisory Committee, which are being transferred to the Department of Commerce from the Office of Telecommunications Policy. The amount appropriated to the Office of Emergency Planning for this activity in FY 1971 will be used for maintaining records of Federal frequency assignment. Computer expenses will continue under the Office of Emergency Planning. Other overhead expenses not transferred are accounted for in the executive direction and administration activity.

OT-10

Department of Electrospace Usage Implementation of Spectrum Monitoring
Feasibility (+14 pos., +\$498,000)

~~most important information needed for making any new assignment of electrospace concerns the then present usage which could mutually interfere with the new user. Electrospace managers do not now possess adequate information of this type.~~

~~The lack of frequency usage data is sufficiently acute that private companies have undertaken surveys to gain a better appraisal of spectrum occupancy. Sporadic monitoring is attempted. Isolated services have records that are not comparable. Little is now available to the public and there is no common basis for collection or dissemination of this information. Needed are: first, agreement on a unit of measurement for electrospace usage; then, reporting of such usage verified by actual measurement on a sampling basis; and finally, methods of interference prediction as developed and verified with the aid of measurements.~~

~~Output will be unified usage data which can be used for frequency selection but much of the frequency assignment technology and usage data will be used directly by the frequency assignment, compatibility, and record keeping subactivities. These outputs will be available to both Federal government and non-Federal users.~~

One of the effective tools in the management of the frequency spectrum is the capability to monitor, measure and analyze emissions throughout the electromagnetic spectrum. These measurements provide: 1) valuable assistance in resolving problems of congestion and interference and 2) one of the diagnostic tools necessary for National Telecommunications Policy formulation.

During FY 1970, contractual research was started by the Office of Telecommunications Management that would define an initial monitoring/measurement program for the Federal Government.

In furtherance of the program undertaken in FY 1970, a monitoring project will be implemented by the Office of Telecommunications to provide a capability for making spot checks on a nationwide basis as to how well the radio spectrum is being used by the various federal agencies. It will also be the medium whereby the office can establish for OTP the credibility and accuracy of the data being reported by the various agencies in the frequency management area. Also, for the first time there will be a capability for obtaining data on how well the established rules and regulations are being complied with. Some of the parameters to be examined are -- time on the air, location of equipment; frequency of the carrier, and spurious emissions.

Specifically, a vehicle will be procured and equipment installed suitable to gather data on the parameters identified by the FY 1970 research. After installing the equipment and verifying its proper operation, data

will be collected and examined to ascertain the validity of reported usage information and to determine how well the various users are complying with established rules and regulations.

Mutual agreement on usage definition must be reached by users, regulators and those responsible for frequency allocations. Such definition must include actual measured usage and channels kept clear for emergencies. New reporting formats will be developed for reporting of usage. Existing reports too often give intended rather than actual use.

Information on usage will be collected both by improved user reporting techniques and by field measurements to obtain objective information on actual frequency usage. Such information will be combined with reported usage to determine the availability of the spectrum, directions required for optimal use and predicting areas of imminent conflict.

~~Electrospace usage, as contrasted to frequency usage, requires measurement of frequency, amplitude, position, polarization, and direction, all of which are important in determining compatibility for assignment purposes. A van will be equipped to measure these quantities. Starting with a medium-sized city, spectrum occupancy will be determined from 10-kHz to 30-GHz. Amplitude probability distributions will be correlated with city characteristics such as size, location, and type of industry. Statistical sampling techniques will be developed. A sufficient number of cities and rural areas will be surveyed to provide reliable models for frequency allocation and to forecast future requirements of growing communities.~~

~~The same equipment will be used to monitor Federal frequency usage, to determine whether government equipment is violating non-government assignments and to evaluate the usage of Federal assignments. Measurements will be correlated with assignment records and with usage records.~~

Frequency Assignment and Compatibility (+22 pos., + \$653,000)

~~Every major study of telecommunications in recent years has noted an apparent crisis in availability of frequency assignments for Federal and non-Federal use. Seven of these studies are cited on page 7 of this document. Depending heavily on information gathered under the Measurement of Electrospace Usage subactivity, this subactivity will develop for electrospace managers the new techniques for assignment needed to eliminate the apparent crisis and to exploit fully the electrospace resource. Faster and more reliable techniques for Federal frequency assignment will be developed, to assure that proposed assignments will not interfere with existing or other proposed assignments.~~

In the long term, the program will be to attack a continuing sequence of specific compatibility and assignment problems, at the same time collecting and correlating the techniques developed for each specific case. The latter activity will build an ongoing and continually strengthened capability for solving further specific problems.

The urgency for FY-1971 is related both to the specific problems to be approached this year and to the need for developing at least a minimal capability for attacking the problems of the future which will intensify the "crisis" nature of the spectrum shortage unless there are techniques available for dealing with them.

A specific case to be attacked in FY-1971 is the following:

International agreements is required on the frequencies to be used for communication between aircraft and satellites. Some decisions are being made even now. These communication links are to be used for high data rates, precise location and navigation, and surveillance. The question is whether to use frequencies around 136 MHz, where many aircraft are already equipped, or go to frequencies around 1550 MHz. The higher frequencies offer advantages such as smaller antenna size for higher directivity, and less interaction of the radio wave with the ionosphere which can decrease the accuracy of navigation aids. Without a solidly based position on this question the U.S. and its airlines will be at a significant disadvantage in international negotiations.

Records collected or generated in the course of these and other studies must be stored so they can be retrieved quickly and easily in order to be of any use in later similar questions. The Defense Intelligence Agency's "Formatted File System" will be examined to see whether it can be adapted for record-keeping for electrospace management. The system is used for keeping up to the minute information on air flights, destination, flight times, direction, and position. It has recently been programmed in the COBOL language, and is therefore independent of any particular computer. It has had significant success in its field, reducing report preparation times from three months to five hours, and the staff required from 32 to 8.

Users of the radio frequency spectrum are increasing at an unprecedented rate. Several major studies of telecommunications over recent years have noted an apparent crises due to congestion in some parts of the radio frequency spectrum. Problems among the increasing numbers of telecommunications devices have arisen as regards the likelihood of their functioning satisfactorily in intended operational environments. There are many problem areas that preclude assurance that the Nation is realizing the most effective utilization of the radio spectrum. Deficiencies contributing to these problem areas are:

- a lack of sufficient management data base;
- a lack of adequate standards pertaining to spectrum occupancy;
- a lack of enforcement capability;
- a proliferation of undiagnosed electromagnetic radiations that could cause harm to human, animal, and plant life;
- a lack of an analytical capability to assure that communications-electronics devices will function satisfactorily in their intended operational environment.

There has been some exploration and documentation of the problem areas through previous contractual efforts. These efforts, corroborated with the recently completed study by the Joint Technical Advisory Committee of the Institute of Electrical and Electronics Engineers, Inc., and Electronic Industries Association, have made it abundantly clear that a major frequency management capability must be developed if the overall function in this area is to be accomplished efficiently, effectively, and economically.

Reactive engineering methods can no longer cope with the rapidly expanding requirements for communications-electronics if the limited and highly congested radio frequency spectrum resource is to be used efficiently. All the essential facts -- technical, economic, social and operational -- which bear on frequency management decisions, and the tools must be made available to perform this task in a timely manner.

Initial work to build up a capability to cope with the foregoing cannot start soon enough. Some services are being denied because of the uncertainty of communications-electronics systems being able to operate in their intended environments. Economic losses have been sustained because of insufficient confidence on the part of private industry to design communications-electronics systems to meet foreseen needs. Millions of dollars have been and are being spent on "fixes" -- modifications to electronics equipment -- after installation because of unpredicted interference situations.

Two particularly critical areas where a capability such as this is needed are 1) Space Telecommunications and 2) Problems of Urban Areas. The former is entirely dependent on radio for its utility. Launch vehicles are guided by radio, and the satellite's position determination as well as information obtained and relayed are all accomplished through various

forms of radio. There have been instances of aborted missions, and lost information because of insufficient capability to evaluate and analyze the type of environment into which spacecraft will be projected. This situation will become more serious unless remedial measures are taken.

Problems of urban areas are significant for several reasons. Law enforcement officials are putting increasing dependence on communications systems to enhance their enforcement capability. Communications are being called upon increasingly in many other areas of urban living including business radio, pollution control, and safety and rescue operations.

These are but two of the more severe problem areas in which the type of capability as proposed herein would provide and perform a vital service.

Inherent in the foregoing, and essential to conducting radio frequency assignment actions, is the continued development of automated data processing techniques for spectrum management. Time sharing computer operations, use of video displays, and an increasingly sophisticated data base are among the tools that must be developed.

OT-15

Supplemental FY 1971 Budget Request
to the Office of Management and Budget

Office of Telecommunications, Department of Commerce

Justification of Program Changes
(Dollar amounts in thousands)

Appropriation: Research, Engineering,
Analysis, and Operations

Activity: Analysis Support for
Policy Formulation

Summary by Project or Line Item:	1971 Presently Available		1971 Revised Estimates		1971 Proposed Supplemental	
	Perm.		Perm.		Perm.	
	Pos.	Amount	Pos.	Amount	Pos.	Amount
Assistance to states and local governments.....	11	\$280	+11	+\$280
Impact of tariff changes..	3	266	+3	+266
Improvements of U.S. tele- communications exports..	12	315	+12	+315
Cost, demand and price data-Telecommunications Information Base.....	5	234	+5	+234
Total requirements.....	31	1,095	+31	+1,095

Justification:

Assistance to States and Local Governments (+11 pos. +\$280,000)

The Federal government provides financial aid to the states and local governmental bodies for health, education, welfare, emergency training, etc., in the amount of some \$20 billion annually. Approximately five percent of this sum, or \$1 billion is for communication equipment and services. State needs are growing more rapidly than Federal budgetary aid. The States and local communities are faced with a requirement to either contract the substantive services they provide or economize on overhead costs, such as communications.

There are substantial economies possible through economizing on spectrum resources, sharing of communication equipment, and creation of effective State and local communication policy. A saving of only one percent of

present Federal aid in State-local communications would represent nearly a million dollars per month in benefits -- either the ability to offer more service or reduce costs. Thus there is ample motivation for the Federal government to see that the assistance it offers is fully utilized, without further delay.

The State of Alaska has perhaps the most urgent needs in this area at the present time. Alaska Public Service Commission hearings concluded in July, 1970 have led to limited certification of RCA Global Communications, Inc. to provide long lines service to the State. The State at present has no long lines service other than that provided by the Federal military units in Alaska. Thus the State and the carrier are together in the position of making decisions in the near future which will affect Alaska's communications for years to come. These decisions will reflect back on the Federal government, since the systems actually built will strongly affect performance of the Federal functions in Alaska.

Since a number of critical decisions will be taken within the next few months, it is urgent that the Federal government offer its assistance immediately. \$200,000 of the current request are budgeted to provide demand forecasts and to lay out an alternative communication systems plans for decisions by State officials.

The communications problems of the State of Alaska present a special and unique situation. Heretofore the State had been dependent on the military owned Alaska Communication System (ACS) for its telephone and telegraph and associated communications. The sale of the ACS to the Radio Corporation of America (RCA) presented a large number of communications problems with which the State was unable to cope. In order to carry out the transfer of the ACS to RCA in a timely fashion, and at the same time enable the State of Alaska to carry out its responsibilities, the Department of Commerce was directed to render assistance. \$200,000 of the current request are budgeted to complete this "on-going" assistance effort.

The Department of Commerce will take advantage of experience gained to develop a model that may be of possible benefit to other States faced with communications problems. The explosion of local and urban communications is requiring State authorities to develop management and regulatory capabilities to handle problems associated therewith.

Concurrently with the specific Alaska study, \$80,000 are requested to initiate programs in connection with aid to other State and local governments. Two kinds of coordination will be developed: A forum at which the chief communication officers of the States can share their problems and their solutions will be formed, in cooperation

with the States. On the other hand, the Office of Telecommunications will immediately begin serving as a central focus for coordination of the telecommunications assistance activities of other Federal agencies such as HUD, HEW, Justice, and Transportation. The objective will be to begin before the end of the fiscal year a systematic program for multifunctional use of communications systems paid for in whole or in part by Federal funds.

Federal assistance funds in the telecommunications areas are not visible to State and local government applicants; are administered with a variety of formulas pertaining to matching funds requirements; are not flexible to permit State and local governments to develop multi-function supporting systems; are not uniform as they concern procurement regulations; are administered most often directly to State and local agencies without Governor or Mayor coordination; may or may not be for demonstration purposes, although they generally are; do not take into account State funding requirements after project termination; are duplicative in many cases; and generally are not coordinated among Federal agencies having similar programs and funds. Policy in these subject areas is needed.

Impact of Tariff Changes (+3 pos., +\$266,000)

The federal government leases major quantities of private line communication facilities to serve both common user (dial connections) and dedicated (fixed point to fixed point) government networks. Recurring line charges to the government exceed \$200 million annually. Estimates of the increased costs due to a recent FCC decision are as high as \$100,000,000 annually. There is immediate need to study the alternatives available within the Federal government of meeting the additional cost burden without adversely affecting the substantive programs utilizing these communication channels. This must be done prior to the effective date of the tariff changes which are anticipated in calendar 1971.

Several service possibilities must be carefully analyzed. Review of traffic service standards must be reviewed. A method of absorbing the increase in charges would be to lower the grade of service, permit increased queuing of calls and greater user delays by reduction in the number of inter-city trunks leased. At the present time, quality of service at some locations is marginal.

Another alternative is to review the necessity and economy of government private line leased networks for the passage of administrative traffic. Logistics information constitutes the overwhelming proportion of the traffic load carried on the common user networks. Reversion to the public message network would have the effect of upgrading service standards and might be most attractive in view of the major pending price increases for leased lines.

~~Another possibility is a single common user voice network and a single data network to meet the administrative communication requirements of both civilian and defense agencies. These now operate independently. There are large potential economies of combined operation. However, consolidation would involve a compromise of the somewhat dissimilar plant operating standards of the respective segments of the government.~~

~~Studies of the magnitude indicated might extend beyond the present fiscal year. The time urgency for initiating these studies as early as possible is the threat of major cost increase in charges for the inter-city trunk facilities. Estimates of increased cost to the federal government range as high as \$100,000,000 per year. The government should be prepared to act rationally in its best interests before the new tariff becomes effective and not wait until services must be curtailed or budget inroads are made into the respective departmental programs.~~

Over the years telecommunications in all its facets has developed into an essential element of the private, commercial, and public life in the United States. No longer are telephone and telegraph systems luxurious adjuncts to mail and messenger services. They are essential to the conduct of the affairs of the nation -- akin to the nervous system in humans. There is an increasing need to weigh the reliance of the economy on telecommunications, to assess the impact of tariffs on all, and finally the converse, to assess the impact of imposed tariffs on the operating and producing interests in the field of telecommunications. Establishment of broad national policy for the use of telecommunications will depend to a significant degree on the substantive information gained through a program of this type.

Improvement of U. S. Telecommunications Exports (+12 pos., +\$315,000)

The world export market for telecommunication equipment over the next decade is estimated to be in excess of \$200 billion. Current U. S. exports of this equipment are averaging less than \$500 million annually. Efforts to make sizable inroads into this market could be extremely rewarding. An early step in this direction is a comprehensive analysis of the constraints which have handicapped American suppliers in expanding export outlets. This analysis will encompass examination of the operating, institutional and marketing problems which confront U. S. telecommunications suppliers in overseas markets. It will include a study of the financing terms offered by domestic manufacturers as well as foreign suppliers; competitive terms of medium and long-term financing offered by the various national administrations including World Bank, Export-Import Bank, AID, etc. The limitation of domestic operating practices vis-a-vis export requirements will be reviewed. Six positions and \$125,000 are requested for this purpose.

Since information collected in the course of current subactivities will also be needed for future programs, it will bring significant savings in time, manpower, and money to store it in an easily retrievable form at the time it is generated. The "band" will provide a form of "capital" knowledge for future as well as current problems.

In FY 1971 known techniques for storing such information, including both computer storage and a conventional library, will be adapted to the needs of the Office of Telecommunications. Collection and storage of both general information and information specific to the subactivities above will be begun. Files generated will be actively used in the studies performed in FY 1971.